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EXAMINER
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ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 04/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/644,817	VOLKOV ET AL.	
	Examiner	Art Unit	
	Shun Lee	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-87 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 52-58,68-74 and 83 is/are allowed.

6)☒ Claim(s) 1-15,17-19,21-49,51,59-61,64,66,67,75-82 and 84-87 is/are rejected.

7)☒ Claim(s) 16,20,50,62,63 and 65 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 03 January 2002 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6 & 8 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Information Disclosure Stat m nt

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

2. The information disclosure statement filed 11 December 2000 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but some of the information referred to therein has not been considered.

Drawings

3. The papers filed on 3 January 2002 (certificate of mailing dated 17 October 2001) have not been made part of the permanent records of the United States Patent and Trademark Office (Office) for this application (37 CFR 1.52(a)) because of damage from the United States Postal Service irradiation process. The above-identified papers, however, were not so damaged as to preclude the USPTO from making a legible copy of such papers. Therefore, the Office has made a copy of these papers, substituted them for the originals in the file, and stamped that copy:

COPY OF PAPERS
ORIGINALLY FILED

If applicant wants to review the accuracy of the Office's copy of such papers, applicant may either inspect the application (37 CFR 1.14(d)) or may request a copy of the Office's records of such papers (*i.e.*, a copy of the copy made by the Office) from the Office of Public Records for the fee specified in 37 CFR 1.19(b)(4). Please do **not** call the Technology Center's Customer Service Center to inquiry about the completeness or accuracy of Office's copy of the above-identified papers, as the Technology Center's Customer Service Center will **not** be able to provide this service.

If applicant does not consider the Office's copy of such papers to be accurate, applicant must provide a copy of the above-identified papers (except for any U.S. or foreign patent documents submitted with the above-identified papers) with a statement that such copy is a complete and accurate copy of the originally submitted documents. If applicant provides such a copy of the above-identified papers and statement within **THREE MONTHS** of the mail date of this Office action, the Office will add the original mailroom date and use the copy provided by applicant as the permanent Office record of the above-identified papers in place of the copy made by the Office. Otherwise, the Office's copy will be used as the permanent Office record of the above-identified papers (*i.e.*, the Office will use the copy of the above-identified papers made by the Office for examination and all other purposes). This three-month period is not extendable.

4. The corrected or substitute drawings were received on 3 January 2002. These drawings are not acceptable.

5. The corrected or substitute drawings are objected to because:

(a) in Fig. 8, the lead line for the reference character "633" does not extend to the feature (*i.e.*, "accelerating electrode"; third paragraph on pg. 28) indicated (37 CFR 1.84(q));

(b) in Fig. 8, the lead line for the reference character "634" does not extend to the feature (*i.e.*, "control grid electrode"; third paragraph on pg. 28) indicated (37 CFR 1.84(q));

(c) in Fig. 15, the random orientation of the elements have been removed;

(d) in Fig. 30, the lead line for the reference character "83" does not extend to the same element as in the original Fig. 30;

(e) in Fig. 41c, "$\omega_{024,1}$" as indicated is different from the original Fig. 41c (see also "$\omega_{024,1}$" in Fig. 41a);

(f) in Fig. 42b, the width labeled "$\omega_{024,1}$" has a different extension than the original Fig. 42b;

(g) in Fig. 46a, the label "Metal Grid Transmission" has been deleted; and

(h) Fig. 44 is missing.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 30, 32, 34, 36, 38, 40, 42, 44, and 502 (last paragraph on pg. 40 to third paragraph on pg. 42), 72 (first paragraph on pg. 59), 849, 859, and 860 (third paragraph

on pg. 66), 610 (last paragraph on pg. 84), 2046a (third paragraph on pg. 98), 2051a and 2051b (first paragraph on pg. 100), and 20 (last paragraph on pg. 107). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 9a (Fig. 1c), 9b (Fig. 1c), 114 (Fig. 6), 407 (Figs. 11a and 11b), 415a (Fig. 11c), 420a (Fig. 11c), 415b (Fig. 11c), 420b (Fig. 11c), 809 (Fig. 13), 814 (Fig. 13), 843 (Figs. 14a and 14b), 860 (Fig. 14b), "90(5)" (Figs. 16 and 30), 1500-1545 (Figs. 17a-17c), 1100.a-1100.n (Fig. 21), 1120.i-1120.j (Fig. 21), 325-340 (Fig. 23b), 1320 (Fig. 26), 88 (Fig. 30), 891a (Fig. 43), 893a (Fig. 43), 893b (Fig. 43), 970 (Fig. 48b), 215a (Fig. 49b), 215n (Fig. 49b), 45-47 (Figs. 50a-50e), 2039-2040 (Figs. 51a and 51b), 2063 (Fig. 51b), 2043 (Figs. 52a-52c), 2007 (Figs. 52a-52c), 2007 (Figs. 52a-52c), and 2016 (Fig. 55). A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "1020" and "1070" (Fig. 20b) have both been used to designate substrate. A proposed drawing correction or corrected drawings are required

in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

9. The disclosure is objected to because of the following informalities:

(a) numerous occurrences of "□" in the specification (*e.g.*, "25□m" in line 9 on pg. 9 should probably be --25 μm--);

(b) "object 16" (e.g., in the fourth paragraph on pg. 11) should probably be --object 3-- (see Fig. 2);

(c) on pg. 21, "sources 105" in the fifth paragraph should probably be --sources 12a, 12b, ...-- (see Fig. 6);

(d) on pg. 22, "sources 12.n" in the fourth paragraph should probably be --sources 12n-- (see Fig. 6);

(e) on pg. 24, "detector array 18.a, 18.n" in the first paragraph should probably be --detector array 18a, ..., 18k-- (see Fig. 6);

(f) on pg. 24, "amplifying and preprocessing units 102.a...102.n" in the first paragraph should probably be --amplifying and preprocessing units 102a, ..., 102k-- (see Fig. 6);

(g) on pg. 32, "source 121" in the third paragraph should probably be --source 12--;

(h) on pg. 35, "elements 196 .a, 196.n" in the second paragraph should probably be --elements 196a, ..., 196r-- (see Fig. 15);

(i) on pg. 43, "radiation 28" in the third paragraph should probably be --radiation 26-- (see Fig. 2);

(j) on pg. 53, "summed image 300" in the third paragraph should probably be --summed image 800-- (see Fig. 25b);

(k) on pg. 55, "551a, ..., 558.b" in the third paragraph should probably be --551b, ..., 558b-- (see Fig. 28b);

(l) on pg. 55, "551-558" in the last two paragraphs should probably be --551b-558b-- (see Fig. 28b);

(m) on pg. 58, "rays 85 and 86" in the second paragraph should probably be --rays 81 and 82-- (see Fig. 30);

(n) on pg. 59, "551-554, 558-559" in the first paragraph should probably be --551a-554a, 558a-559a-- (see Fig. 31);

(o) on pg. 68, the first line appears to be missing words between "the" and "In";

(p) on pg. 89, "24b" in the first paragraph should probably be --49a--;

(q) on pg. 95, "2030" in the fourth paragraph should probably be --2031--;

(r) on pg. 97, "2001" in the second paragraph should probably be --2034--; and

(s) on pg. 100, "Figure 42b" in the first paragraph should probably be --Figure 41--.

Appropriate correction is required.

10. The use of the trademark DUROID, MYLAR, TEFLON, and STYCAST has been noted in this application. It should be capitalized (*e.g.*, MYLAR) wherever it appears (*e.g.*, pg. 49, 50, 88) and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

11. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

12. Claims 1, 11, 47, 75, and 87 are objected to because of the following informalities:

(a) in claim 1, "the" on line 1 should probably be --the apparatus--;

(b) "a multi-element receiver" on lines 7-8 and again on line 10 of claim 11 is indefinite and can lead to misinterpretation (if both elements are the same, the later should be identified as --said multi-element receiver--);

(c) in claim 47, "radiation scatterers" on line 1 should probably be --said radiation scatterers--;

(d) in claim 75, "form" on line 8 should probably be --from--; and

(e) in claim 87, "the the" on line 12 should probably be --the--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

13. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

14. Claims 27-34 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for wavelengths of 0.1 mm to 10 mm, does not

reasonably provide enablement for wavelengths greater than 10 mm. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. The specification discloses (third paragraph on pg. 4) that microwave radiation (wavelengths of 1 mm to 1 m) exhibit wavelengths which are too large to carry a needed volume of information concerning contraband objects. Further, there is no disclosure of how to make and use the invention with wavelengths greater than 10 mm. Thus the specification fails to provide enablement for wavelengths greater than 10 mm.

15. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

16. Claims 84-87 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 84-87 recite the limitation "the system" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

17. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

18. Claims 1-10, 21-23, 27-34, 59-61, 64, 66, and 67 are rejected under 35 U.S.C. 102(b) as being anticipated by Huguenin *et al.* (WO 90/07130).

In regard to claims **1** and **10**, Huguenin *et al.* disclose (Figs. 2, 8, and 11) an apparatus for imaging, the apparatus comprising:

(a) means for illuminating a field of view with composite radiation (*i.e.*, at least one composite radiation source 26, 162, 164, and/or beacon 1 not illustrated but described on pg. 31, lines 18-20), the radiation comprising a set of multiple phase-independent partials being independently controllable and exhibiting distinct physical features (pg. 21, line 31 to pg. 22, line 9; pg. 26, lines 17-32; pg. 39, lines 19-28; pg. 42, lines 19-21; pg. 49, lines 5-12; pg. 56, lines 19-23; pg. 60, lines 17-26);

(b) quasi-optical means for forming images of the field of view (*i.e.*, a quasi-optical element 40 disposed between the field of view and a multi-element receiver 36, 168); and

(c) multi-element receiving means (comprising receiver 36, 168) for receiving image radiation from the quasi-optical means (*i.e.*, element 40), wherein the receiving means (comprising receiver 36, 168) including means (pg. 26, lines 17-32; pg. 60, lines 17-35) for transforming the image radiation into a set of electrical signals including information relating to features of the partials.

In regard to claim **2** which is dependent on claim 1, Huguenin *et al.* also disclose (pg. 21, line 31 to pg. 22, line 9; pg. 26, lines 17-32; pg. 39, lines 19-28; pg. 42, lines 19-21; pg. 49, lines 5-12; pg. 56, lines 19-23; pg. 60, lines 17-26) that the at least one source of composite radiation includes an encoder (*e.g.*, 180, 182 in Fig. 2) configured to label each of the partials with a unique code.

In regard to claim **3** which is dependent on claim 2, Huguenin *et al.* also disclose (pg. 21, line 31 to pg. 22, line 9; pg. 26, lines 17-32; pg. 39, lines 19-28; pg. 42, lines 19-21; pg. 49, lines 5-12; pg. 56, lines 19-23; pg. 60, lines 17-26) that each distinct partial is labeled with a distinct unique code.

In regard to claim **4** which is dependent on claim 2, Huguenin *et al.* also disclose (pg. 26, lines 17-32; pg. 60, lines 17-35; Figs. 2, 8, and 11) a decoder (22, 178) to extract the information relating to the features of the partials from the electrical signals.

In regard to claim **5** which is dependent on claim 1, Huguenin *et al.* also disclose (Figs. 2, 8, and 11) a processor (22, 178) coupled to receive the electrical signals from the receiver, the processor (22, 178) to generate a resultant image from the electrical signals (pg. 25, lines 23-26; pg. 27, lines 18-22).

In regard to claim **6** which is dependent on claim 1, Huguenin *et al.* also disclose that the partials within the set of partials differ from each other by angles of propagation (from the sources 162, 164; see Fig. 2) in the field of view.

In regard to claim **7** which is dependent on claim 6, Huguenin *et al.* also disclose (pg. 31, lines 13-33) that partials of the set exhibit first characteristic polarization.

In regard to claim **8** which is dependent on claim 1, Huguenin *et al.* also disclose (Fig. 11) a polarizer (28) coupled between the at least one source of composite radiation (26) and the multi-element receiver (36).

In regard to claim **9** which is dependent on claim 1, Huguenin *et al.* also disclose (pg. 8, lines 15-18) that the at least one source of composite radiation generates radiation having a wavelength between about 0.1 mm and about 10 mm.

In regard to claim **21**, Huguenin *et al.* is applied as in claims 1 and 2.

In regard to claim **22** which is dependent on claim 21, Huguenin *et al.* also disclose (pg. 26, lines 17-32) that the electrical control signals control the level of spatial coherence of the partially coherent radiation.

In regard to claim **23** which is dependent on claim 21, Huguenin *et al.* also disclose (pg. 60, lines 17-26) that the electrical control signals control the level of temporal coherence of the partially coherent radiation.

In regard to claim **27**, the method steps are implicit for the apparatus of Huguenin *et al.* since the structure is the same as the applicant's apparatus of claim 1, 2, 9, and 10.

In regard to claim **28** which is dependent on claim 27, Huguenin *et al.* is applied as in claim 6.

In regard to claim **29** which is dependent on claim 27, Huguenin *et al.* also disclose (pg. 39, line 30 to pg. 40, line 3) that the multiple partial components comprises radiation components with different central (*i.e.*, resonant) frequencies.

In regard to claim **30** which is dependent on claim 27, Huguenin *et al.* also disclose (pg. 21, line 31 to pg. 22, line 9) that the multiple partial components comprises radiation components with different polarization characteristics.

In regard to claim **31** which is dependent on claim 27, Huguenin *et al.* also disclose that the step of encoding comprises modulating (pg. 56, lines 19-23) to label different ones of the multiple partial components.

In regard to claim **32** which is dependent on claim 27, Huguenin *et al.* also disclose (pg. 39, line 30 to pg. 40, line 3) that the radiation comprises at least one spectral doublet (*i.e.*, two different resonant frequencies).

In regard to claim **33** which is dependent on claim 27, Huguenin *et al.* also disclose (pg. 48, line 23 to pg. 54, line 22) that further comprising modifying the electrical signals based upon the information extracted relating to the features of the multiple partial components.

In regard to claim **34** which is dependent on claim 27, Huguenin *et al.* also disclose (pg. 48, line 23 to pg. 54, line 22) that extracting includes decomposing the electrical signals based on the partial components.

In regard to claim **59**, Huguenin *et al.* disclose a method for creating radiation that includes a polarized doublet, the method including:

(a) emitting radiation (pg. 39, line 28 to pg. 40, line 3; pg. 41, lines 9-17) at a first s-mmw frequency;

(b) emitting radiation (pg. 39, line 28 to pg. 40, line 3; pg. 41, lines 9-17) at a second s-mmw frequency, wherein the difference between the first s-mmw frequency and the second s-mmw frequency is much smaller than the average (*e.g.*, 95 GHz) of the first s-mmw frequency and the second s-mmw frequency;

(c) polarizing (pg. 21, line 31 to pg. 22, line 9) the radiation at the first s-mmw frequency into a first characteristic polarization;

(d) polarizing (pg. 21, line 31 to pg. 22, line 9) the radiation at the s-mmw frequency into a second characteristic polarization; and

(e) combining (pg. 38, lines 19-28) the radiation at the first s-mmw frequency and the radiation at the second s-mmw frequency; and

(f) directing (pg. 38, lines 19-28) the combined radiation to a destination.

In regard to claim **60** which is dependent on claim 59, Huguenin *et al.* also disclose (pg. 38, lines 12-17) that the first polarization is essentially equal to the second polarization.

In regard to claim **61** which is dependent on claim 59, Huguenin *et al.* also disclose (pg. 21, line 31 to pg. 22, line 9) that the first polarization is essentially orthogonal to the second polarization.

In regard to claim **64** which is dependent on claim 59, Huguenin *et al.* also disclose (pg. 39, lines17-25) changing average of the first s-mmw frequency and the second s-mmw frequency.

In regard to claim **66** which is dependent on claim 59, Huguenin *et al.* also disclose (pg. 38, lines 19-28) that the method is performed in a waveguide configuration.

In regard to claim **67** which is dependent on claim 59, Huguenin *et al.* also disclose (pg. 38, lines 19-28) that the method is performed in a planar substrate configuration.

19. Claims 35-37, 39, 40, 42, 44, 45, 48, and 51 are rejected under 35 U.S.C. 102(b) as being anticipated by Farhat (US 4,090,204).

In regard to claims **35-37**, **39**, **40**, **42**, **44**, **45**, and **51**, Farhat discloses (Fig. 1) a source of partially coherent radiation for illuminating a field of view, the source comprising:

(a) at least one non-movable diffuser destroying a spatial coherence (*i.e.*, incident plane wavefront) of radiation being incident on the diffuser and directing the radiation (*i.e.*, reflected spatially phase modulated wavefront) towards a field of view, the diffuser including an array of spatially distributed diffuser comprising independently electronically controllable antennae or radiation scatterers (*i.e.*, an antenna system comprising conductive reflective surface); and

(b) at least one radiation emitting source (20, 22) being arranged to illuminate said diffuser with radiation having a wavelength between about 0.1 mm and about 10 mm (*i.e.*, millimeter and submillimeter frequency wave bands; column 1, lines 13-17).

In regard to claim **48** which is dependent on claim 44, Farhat also discloses (column 1, lines 20-36) that the radiation scatterers can be independently controlled by physically moving the point scatterers with respect to a reference plane.

Claim Rejections - 35 USC § 103

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

21. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

22. Claims 11-14, 17-19, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huguenin *et al.* (WO 90/07130) in view of Farhat (US 4,090,204).

In regard to claims **11-14**, **17**, and **18**, Huguenin *et al.* is applied as in claims 1, 5, 9, and 10 above. The s-mmw imaging system of Huguenin *et al.* lacks that the at least one source comprises a non-rotating diffuser destroying a spatial coherence of radiation received from a radiation source, the diffuser is a spatially distributed diffuser comprising a two-dimensional array of electronically-controllable point scatterers, each of the point scatterers having a position and orientation which can be independently changed in time relative to a reference plane. As discussed above, Farhat discloses a source of partially coherent radiation for illuminating a field of view which comprises a non-rotating diffuser destroying a spatial coherence of radiation received from a radiation source, the diffuser is a spatially distributed diffuser comprising a two-dimensional array of electronically-controllable point scatterers, each of the point scatterers having a position and orientation which can be independently changed in

time relative to a reference plane. Further, Farhat discloses (column 3, lines 26-36) the antenna system is a simple and low cost system which allows modulation of spatial phase distribution at megahertz rates. Therefore it would have been obvious to one having ordinary skill in the art to provide a non-rotating diffuser in the s-mmw imaging system of Huguenin *et al.*, in order to obtain a simple and low cost system which allows modulation at megahertz rates as taught by Farhat.

In regard to claim **19** which is dependent on claim 11, the s-mmw imaging system of Huguenin *et al.* lacks that the radiation incident on the diffuser includes doublet spectral components. However, Huguenin *et al.* also disclose (pg. 39, line 30 to pg. 40, line 3) that the radiation comprises at least one spectral doublet (*i.e.*, two different resonant frequencies). Therefore it would have been obvious to one having ordinary skill in the art that the radiation in the s-mmw imaging system of Huguenin *et al.* comprises at least one spectral doublet (*i.e.*, two different resonant frequencies).

In regard to claim **24** which is dependent on claim 21, Huguenin *et al.* in view of Farhat is applied as in claims 11-14, 17, and 18 above.

23. Claims 15, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huguenin *et al.* (WO 90/07130) in view of Farhat (US 4,090,204) as applied to claims 13 and 24 above, and further in view of Chow *et al.* (US 5,982,326).

In regard to claim **15** which is dependent on claim 13, the modified s-mmw imaging system of Huguenin *et al.* lacks that the point scatterers comprise conductive structures being loaded by impedances. Chow *et al.* teach (Fig. 1) to provide an active

micropatch antenna (16) allowing connection to an active circuit (22, 28) suitable for amplification (column 2, line 30 to column 3, line 35). An antenna which is connected to an active circuit is also being loaded by impedances (see column 6, lines 26-35 of Chow *et al.*) from the connections to the active circuit. Therefore it would have been obvious to one having ordinary skill in the art to connect the conductive structures in the modified s-mmw imaging system of Huguenin *et al.* to active circuits, in order to amplify the scattered radiation as taught by Chow *et al.*

In regard to claim **25** which is dependent on claim 24, Chow *et al.* is applied as in claim 15 above. The modified imaging system of Huguenin *et al.* lacks that the magnitudes of the impedances are time-varied due to modulation. Huguenin *et al.* also disclose (pg. 60, lines 17-26) that time-varied modulation of the illumination beam allows the derivation of information concerning relative position, velocity, and range of objects in the field of view. Therefore it would have been obvious to one having ordinary skill in the art to provide time-varied magnitude modulation of the impedances in the modified imaging system of Huguenin *et al.*, in order to derive information concerning relative position, velocity, and range of objects in the field of view.

In regard to claim **26** which is dependent on claim 25, Huguenin *et al.* also disclose (pg. 21, line 31 to pg. 22, line 6) that a plurality of individual sources (*i.e.*, point scatterers) are divided into sets and wherein each individual source within a set of individual sources is modulated in the same manner.

24. Claims 38, 41, 46, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farhat (US 4,090,204) in view of Huguenin *et al.* (WO 90/07130).

In regard to claim **38** (which is dependent on claim 37), claim **41** (which is dependent on claim 40), and claim **46** (which is dependent on claim 45), the source of Farhat lacks that each of the radiation scatterers is electronically controllable by a time-varying modulation signal. Huguenin *et al.* also disclose (pg. 60, lines 17-26) that time-varied modulation of the illumination beam allows the derivation of information concerning relative position, velocity, and range of objects in the field of view. Therefore it would have been obvious to one having ordinary skill in the art to provide time-varied modulation in the source of Farhat, in order to derive information concerning relative position, velocity, and range of objects in the field of view as taught by Huguenin *et al.*

In regard to claim **47** which is dependent on claim 46, the source of Farhat lacks that the radiation scatterers are assigned into sets and wherein each radiation scatterer within a set of radiation scatterers is modulated in the same manner. Huguenin *et al.* also disclose (pg. 21, line 31 to pg. 22, line 6) that a plurality of individual sources (*i.e.*, point scatterers) are divided into sets and wherein each individual source within a set of individual sources is modulated in the same manner in order to detect different materials (pg. 19, lines 1-34). Therefore it would have been obvious to one having ordinary skill in the art to provide time-varied modulation different set of radiation scatterers in the source of Farhat, in order to detect different materials as taught by Huguenin *et al.*

25. Claims 43 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farhat (US 4,090,204) in view of Chow *et al.* (US 5,982,326).

In regard to claim **43** (which is dependent on claim 39) and claim **49** (which is dependent on claim 44), the source of Farhat lacks that each scatterer comprise a conductive structure loaded by an impedance. Chow *et al.* teach (Fig. 1) to provide an active micropatch antenna (16) allowing connection to an active circuit (22, 28) suitable for amplification (column 2, line 30 to column 3, line 35). An antenna which is connected to an active circuit is also being loaded by impedances (see column 6, lines 26-35 of Chow *et al.*) from the connections to the active circuit. Therefore it would have been obvious to one having ordinary skill in the art to connect the conductive structures in the source of Farhat to active circuits, in order to amplify the scattered radiation as taught by Chow *et al.*

26. Claims 75-82 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huguenin *et al.* (WO 90/07130) in view of Farhat (US 4,090,204) and Chow *et al.* (US 5,982,326).

In regard to claims **75-78**, Huguenin *et al.* disclose a method of creating radiation that includes a co-polarized doublet, the method comprising:

(a) providing (pg. 39, line 28 to pg. 40, line 3; pg. 41, lines 9-17) a voltage controlled oscillator operating at a first s-mmw frequency; and

(b) polarizing (pg. 21, line 31 to pg. 22, line 9) the oscillator in a first characteristic polarization state.

The method of Huguenin *et al.* lacks scattered radiation from a point scatterer illuminated by the oscillator, wherein point scatterer comprises an antenna and a complex impedance preferentially sensitive to the first characteristic polarization and is

load modulated with a periodic time varying signal. Farhat discloses (column 3, lines 26-36) a simple and low cost antenna system which allows modulation of spatial phase distribution at megahertz rates. Chow *et al.* teach (Fig. 1) to provide an active micropatch antenna (16) allowing connection to an active circuit (22, 28) suitable for amplification (column 2, line 30 to column 3, line 35). An antenna which is connected to an active circuit is also being loaded by impedances (see column 6, lines 26-35 of Chow *et al.*) from the connections to the active circuit. Huguenin *et al.* also disclose (pg. 60, lines 17-26) that time-varied modulation of the illumination beam allows the derivation of information concerning relative position, velocity, and range of objects in the field of view. Therefore it would have been obvious to one having ordinary skill in the art to provide a simple and low cost antenna system which is load modulated with a time varying signal in the method of Huguenin *et al.*, in order to obtain a simple and low cost system which produces amplified scattered radiation modulation at megahertz rates as taught by Chow *et al.* and Farhat so as to derive information concerning relative position, velocity, and range of objects in the field of view.

In regard to claims **79** and **80** which are dependent on claim 78, the method of Huguenin *et al.* lacks that the periodic signal has a ground harmonic frequency equal to half of a doublet frequency difference or a doublet frequency difference. However, Huguenin *et al.* also disclose (pg. 56, lines 19-23) that the periodic signal can be any code suitable for modulation such as a simple sine wave of a predetermine frequency. Therefore it would have been obvious to one having ordinary skill in the art to provide a

predetermine frequency for the time varying signal in the method of Huguenin *et al.* such as half of a doublet frequency difference or a doublet frequency difference.

In regard to claim **81** which is dependent on claim 78, Huguenin *et al.* also disclose (pg. 56, lines 19-23) that the periodic signal is a binary signal.

In regard to claim **82** which is dependent on claim 78, Huguenin *et al.* also disclose (pg. 56, lines 19-23) that the periodic signal is a harmonic signal.

Allowable Subject Matter

27. Claims 52-58, 68-74, and 83 are allowed.

28. Claims 16, 20, 50, 62, 63, and 65 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

29. The following is a statement of reasons for the indication of allowable subject matter: the instant application is deemed to be directed to an nonobvious improvement over the invention patented in US Patent 5,073,782. The improvements comprise in combination with other recited elements: (a) a processor causing the point scatterers to be controlled based on information determined from the electrical signals received from the receiver as recited in claim 16; (b) modulating a spectral shift (difference) between doublet spectral components as recited in claims 20 and 65; (c) each radiation scatterer comprises a static high-Q resonant scatterer exhibiting frequency resonance belonging to a particular frequency band and wherein the radiation emitting source comprises a radiation source that sweeps over the particular frequency band as recited in claim 50; (d) each radiation component being labeled by a given frequency shift between the two

spectral lines as recited in independent claim 52 (and claims 53-58 which depend from claim 52) and independent claim 83; (e) controlling the difference between a first s-mmw frequency and a second s-mmw frequency as recited in claims 62 and 63; and (f) scattering radiation from a first and second sets of point scatterers by directing energy of a voltage controlled oscillator operating at a first s-mmw frequency to uniformly illuminate the set of first polarization state point scatterers load-modulated with a first time varying signal and the set of second polarization state point scatterers load-modulated with a second time varying signal, wherein the first and second polarization states are orthogonal and the oscillator is polarized in a third characteristic polarization state substantially differs from the first and second polarization state, and wherein the ground harmonic of first time varying signal essentially differs from any harmonic of the second harmonic time varying signal as recited in independent claim 68 (and claims 69-74 which depend from claim 68).

Conclusion

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Tuesday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

CONSTANTINE HANNAHER
PRIMARY EXAMINER
GROUP ART UNIT 2878

SL
April 18, 2003